

Exploring Block Chain Technology's Potential in Education System

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Abstract

Recently, blockchain technology has gained appreciable attention from researchers and practitioners. This can be primarily thanks to its distinctive features together with decentralization, security, reliability, and data integrity. Despite this growing interest, very little is thought regarding this state of knowledge and how relating to the employment of blockchain technology in education. It's been widely utilized in digital currency, sensible contract, credit encryption and different fields. With the event of the net technology, on-line education, a completely unique education mode, has been greatly popularized. However, this education mode still faces several issues in course quality, credit and certificate certification, student privacy, and course sharing. Through literature review and case analysis, this paper discusses the essential technical principles and application options of blockchain technology, and proposes an answer to the issues of on-line education supported blockchain technology. The blockchain technology will store learning records during a trusty, distributed manner, give credible digital certificates, notice learning resource sharing with sensible contract, and shield belongings through encryption. The analysis shows that the combination of blockchain technology could be a promising trend within the development of on-line education.

Keywords: Blockchain technology, agile and current education system, Advantages, challenges of Blockchain in education area.

Introduction:

The education industry is dynamical before our eyes. Not only the province of a centralized learning surroundings in either the physical or virtual worlds, education currently happens via peer-to-peer interactions, on-line and from anyplace on the world. Academic suppliers, notably in higher-ed, area unit troubled to harness digital technology as a tool for transformation. In the ancient academic understanding, people follow the trail of obtaining graduate or post-graduate education if they want, when continued their education from preschool to highschool. Today, by obtaining out of this stereotype, each individual will select totally different learning environments. Within the ancient education system, several variables like age, gender, previous academic expertise, place of residence, Associate in Nursing socio-economic state of affairs is an obstacle for the individual to profit from formal education; but with the reflections of technology on education, nowadays there area unit several prospects for spreading education, differentiation and massifying of applications for people.

Blockchain is Associate in Nursing rising technology introduced in 2008. It had been initially used as a peer-to-peer ledger for registering the transactions of Bitcoin cryptocurrency.

Education may be a sector that's even as necessary as tending and finance, and there area unit numerous areas among this sector that would be improved exploitation technology.

The various styles of on-line education is divided into education, examination and certification coaching, personal skills improvement, language education, time of life education, K-12 education (kindergarten to twelfth grade), etc.

What is Blockchain?

Blockchain could be a data structure of knowledge blocks organized in written record order. it's featured by decentralization, trustiness, data sharing, security, etc. it's been wide utilized in digital currency, good contract, credit encoding and different fields. With the event of the web technology, on-line education, a completely unique education mode, has been greatly popularized. The aim was to eliminate any third-party treater and permit users to create their transactions directly. to realize that, blockchain was designed as a suburbanized network of peer nodes. every node within the network: (1) holds a reproduction of the transactions ledger, (2) writes associate entry to its own ledger once it receives accord from the opposite nodes within the network, (3) broadcasts any transaction created by its user to the opposite nodes within the network, and (4) checks, on a daily basis, that the ledger it holds is the image of those across the network. As the name would imply, records square measure unbroken on platforms called blocks and are organized in an exceedingly chain, one when the opposite. Whenever a replacement record is additional to a blockchain, a replacement block is additional to the tip of the chain, connected to the block that had antecedently been at the tip of the chain. As such, the information is unceasingly being additional to, with the chain growing longer as new blocks square measure additional. Blockchain technology permits the creation of a suburbanized setting, wherever transactions and knowledge don't seem to be underneath the management of any third party organization. Any dealing ever completed is recorded in an exceedingly public ledger in an exceedingly variable and permanent means.

Current problems in agile education system and online system

The current model of higher education nowadays is very rigid with very little flexibility. It expects all students with completely different levels of intelligence and interest undergo identical extraordinarily structured course of education.

Its tightly outlined learning ways offer students and lecturers with {little|very very little} chance to explore their creativity; its heavily standardized curricula build it exhausting to fulfill the requirement for brand spanking new skills and for continuous learning of rising technologies; and its exam-oriented and score-based approach to gauge the potential of scholars leaves little space to spot various,

In today's apace dynamic world students have to be compelled to shrewdness to equip themselves with market-driven skills, the way to discover their skills in various areas and the way to demonstrate their ability in a very vary of various topics. There ar some issues ar connected with administrator work additionally.

a number of them ar losses of paper certificates, frauds in education certificates, issue in verificatory credibility, disconnected long learning records. However, this education mode faces several issues in course quality, credit and certificate certification, student privacy, and course sharing. Through literature review and case analysis, thanks to the fast development of web technology, on-line education has entered a stage of rising since the flip of the century.

on-line education, conjointly referred to as distance education or on-line learning, may be a web-based pedagogics for content dissemination and quick learning victimisation info technology and web technology. With the net because the medium, on-line teaching transcends the bounds on venue, surroundings, time and lecturers, and offers students quality teaching activities anytime, anywhere.

Despite the huge quality, the present forms associate degreed systems of on-line education have several defects within the face of an more and more open and digital web. for instance, the training method and results of MOOCs ar in need of public recognition and official certification; the students' privacy is in danger, for the courses and knowledge security alone depend upon the centralized on-line education platform; the students' property can't be maintained effectively thanks to the openness of the net and therefore the tamperability of data; there's no mature cross-platform course sharing mechanism to totally share the teaching resources. To form the training method and results trustable, it's necessary to develop a distributed and trustable knowledge storage technique to record the students' learning method, disclose all learning knowledge to the general public, and make sure the security and non-tamperability of knowledge.

Advantages of blockchain in education system

When a brand new information is recorded onto the blockchain by a community member, the info is initial parcelled in a very block, verified and sealed. The new block is then instantly and mechanically distributed onto all of the opposite nodes within the network. once being valid by every node, it'll be additional to the previous block to form a series. this may make sure that each member of the community sees the foremost up-to-date records in a very network of nodes with no single purpose of failure. victimization this method, blockchain could improve any foreseeable, repeatable method wherever data has to be sent, stored, accessed, and verified firmly whereas enhancing their fixity and resiliency. Many skilled Learning Institutes record certificates firmly on blockchain Students have verifiable certificates, keep all records in one place for keeps. And for employers verify certificates of candidates and employees simply. Blockchain brings responsibility, trust, security, potency in data storage and security. Blockchain is reliable attributable to the decentralized nature of a blockchain network changes the databases of the whole dealings records from closed and centralized ledgers maintained by solely a number of commissioned institutions to open distributed ledgers maintained by tens of thousands of nodes. The failure of one node doesn't have an effect on the operation of the total network. This avoids the one purpose of failure and ensures the high responsibility of the applications that engineered on the blockchain technology. These ledgers area unit shared among a network of tamper-proofed nodes. Security: blockchain network uses the unidirectional hash operate that may be a mathematical relation that takes a variable-length input string and converts it into a fixed-length binary sequence.

the method is tough to reverse as a result of, given simply the output, the input is not possible to work out. moreover, the recently generated block is strictly following the linear sequence of your time. Efficiency: all information area unit mechanically run through pre-set procedures. Therefore, blockchain technology can't solely considerably scale back the value of labor however additionally For the digital currency of Blockchain one.0, the automation of distributed ledger is principally the automation of settlement. The output bears no apparent relationship to the input. Blockchain technology might speed the clearing and settlement of bound monetary transactions by reducing the amount of intermediaries concerned, and by creating the reconciliation method quicker and a lot Blockchain technology may be a fascinating tool to resolve the issues of on-line education, namely, poor certification, lack of recognition and information insecurity. Currently, this technology is principally applied in such field as finance, the net, and net of Things (IoT). Typical monetary applications embody digital currency, currency transfer, exchange and payment systems.sensible contracts, starting from securities, stocks to bank loans, is implemented mechanically while not human intervention [1].of the IoT, the blockchain technology permits devices to speak autonomously and determine errors [2].This technology has additionally been applied preliminarily

within the field of education. conjointly maintained: The blockchain information area unit conjointly maintained by all Since no node is excluded from the upkeep, the error of one node has no impact on the info of the total network.

Privacy safe: because of the digital signature rule, the info area unit transmitted victimization the general public key and therefore the personal key, while not revealing the node identities. The user is totally invisible within the transmission method. Blockchain technologies gift monumental opportunities to assist teaching providers: Reduce prices and eliminate fraud by avoiding manual verification of transcripts and different documents. Increase innovation by providing a platform for collaboration between business and academic establishments, similarly as different prospects. Boost efficiencies via “smart contracts” that execute mechanically once bound conditions area unit met.

Academics-Blockchain integration

The application of blockchain to education continues to be in its early stages. only atiny low range of academic establishments have began to utilize blockchain technology. Most of those establishments ar exploitation it for the aim of corroboratory and sharing academic certificates and/or learning outcomes that their students have achieved The blockchain technology will store learning records in an exceedingly sure, distributed manner, offer credible digital certificates, notice learning resource sharing with smart contract, and shield holding through encoding. The analysis shows that the mixing of blockchain technology may be a promising trend within the development of on-line education. The use of blockchain as a distributed ledger, its token-based platform and sensible contracts will facilitate the institution of agile education and distributed learning. By breaking down curricula into small items, the intrinsic flexibility of sensible contracts will enable the system to validate the data and skills noninheritable by students through formal and By employing a token-based reward system as a symbol of data, students would now not be restricted to their degree certificate to demonstrate their ability.

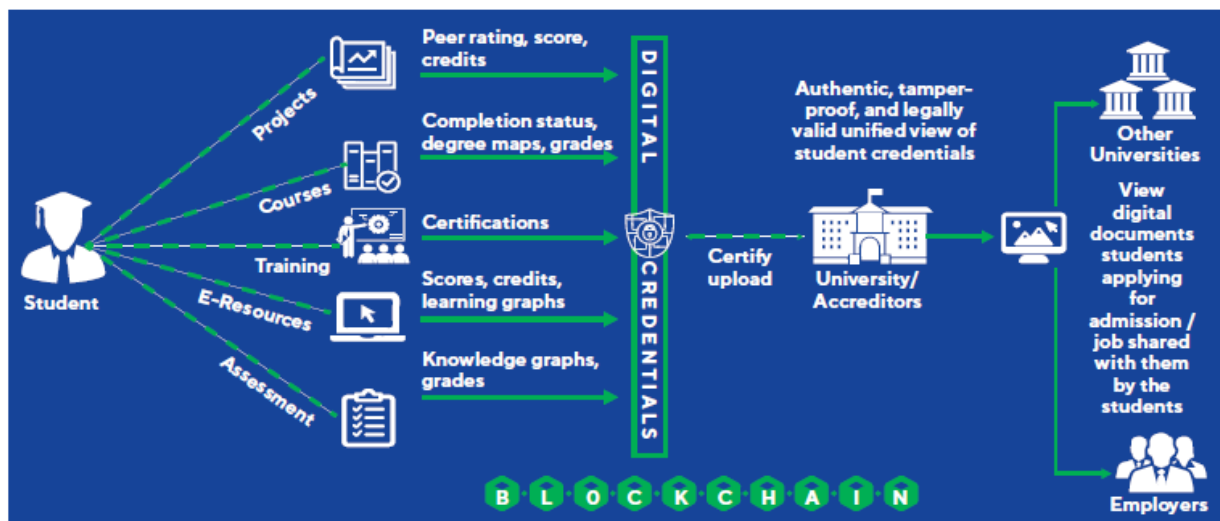
Ensuring Digital Identity through Blockchain



The token-based reward system also can open new doors to accelerate the crowd-sourcing of skills and expertise on demand, encouraging students to use their knowledge and expertise within the market as soon as possible instead of waiting until the end of their degree. Such a system can't only bring agility to the training process, but also can provide more transparency, efficiency and fairness to the education system. It can help authorities to have a better control over performance of the students receiving bursary and encourage them to work harder if they would like to remain eligible for receiving the fund. Potential applications of blockchain in education include:

1. Storage of permanent records.
2. Learner identity verification and information security.
3. Student ownership of lifelong learning credentials.
4. Automatic credit transfers.
5. Intellectual property protection for educational content.

Student Credentialing through Blockchain



Challenges of implementing blockchain technology in education.

As there is not any central authority responsible, a elementary drawback throughout a distributed setting like blockchain is to appreciate overall system reliableness among the presence of type of to attain that a collection of “cryptoeconomic rules” is implemented by a blockchain so as to keep up distributed agreement across the blockchain’s peer-to-peer network like Proof-of-Work, Proof-of-Stake, etc..One challenge is that there ar completely different standards for some way a blockchain ought to be created, albeit the underlying principals ar for the most part identical. If the blockchain, for credentialing functions, is supposed to show a learner’s history, people who were already well into their career would be at an obstacle unless their competencies and certifications were retroactively Considering the complications this might cause, and alternative similar challenges, governance by education suppliers are essential. These governance “challenges would need a joint effort to create certain that the standards for digital credentialing systems ar open that they take under consideration the requirements of all For blockchain to create an enormous impact on the education house, grassroots-level amendment is needed,

conjointly as collaboration from all the stakeholders across borders. Another potential issue for blockchain would be the transferring of older records

Conclusion

With the event of internet technology, on-line education has become a replacement approach for individuals to amass information. However, on-line education still faces such issues because the lack of results certification, poor privacy and therefore the absence of sharing mechanism. As associate rising engineering, blockchain has been wide adopted in numerous fields because of the decentralised, de-trusted, reliable options. Therefore, this paper combines the blockchain technology with on-line education to unravel the aforementioned issues, forming a wise, decentralised and sharing on-line education system. The analysis findings mark the event trend of on-line education.

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